his work in the physical laboratory and acquire some facility in determining the accuracy and significance of his measurements.

A. DE FOREST PALMER

Electric Arcs. By CLEMENT D. CHILD, Ph.D., professor of physics, Colgate University. New York, D. Van Nostrand Company. 1913. Pp. 194.

A text of this kind must interest at least two classes of readers; those who wish to know more of the physics of the electric arc and those who are intensively engaged in arc lamp development. The author has digested the results of those investigations made since the publication of Mrs. Ayrton's "The Electric Arc," which contains a similar digest of the investigations made previous to 1898.

In the first six chapters the author discusses the relations between terminal voltage, current, resistance and E.M.F. of pure carbon, impregnated carbon, pure metal and metallic oxide arcs operated with direct and alternating current in air and in various gases at different pressures. This discussion also includes the performance of the mercury arc rectifier and the mercury arc lamp under various conditions.

The seventh chapter, headed "Photometry of the Electric Arc," contains information regarding the light-producing properties of various electric arcs and scarcely touches upon the measurement of light suggested by the caption. The following chapter contains a brief review of the use of the electric arc in wireless telephony. All hypothesis regarding the electric arc is reserved for the last chapter, where the author offers an explanation of certain arc phenomena in the ionic theory.

The book would take on added interest from the scientific viewpoint if it contained references to the action of electric arcs between metal terminals in liquids such as alcohol, mineral oil, carbon-tetrachloride, etc., or high tension arcs in air. Although the book title suggests a more general discussion the author pays more attention to the "light-producing electric arc."

The text includes an extensive bibliography to which detailed references are made at the appropriate place. The continuity of the discussion is increased by the results of the author's own investigations whenever the reports of others failed to reveal the required data. Thoroughness and presentation of many viewpoints characterize the text throughout. To the student interested in electric arc phenomena a careful reading of Mrs. Ayrton's text followed by that of Dr. Child should prove an invaluable foundation upon which to base further investigations.

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SCIENTIFIC JOURNALS AND ARTICLES

THE April number (Vol. 16, No. 2) of the *Transactions of the American Mathematical Society* contains the following papers:

L. E. Dickson: "Quartic curves modulo 2."

W. A. Hurwitz: "Mixed linear integral equations of the first order."

W. B. Fite: "Prime power groups in which every commutator of prime order is invariant."

W. A. Manning: "On the order of primitive groups, II."

J. W. Alexander, II.: "A proof of the invariance of certain constants of analysis situs."

A. B. Coble: "Point sets and allied Cremona groups (part I.)."

C. T. Sullivan: "Scroll directrix curves."

THE April number (Vol. 21, No. 7) of the *Bulletin of the American Mathematical Society* contains: "The rôle of the point-set theory in geometry and dynamics," by E. B. Van Vleck; "An enumeration of integral algebraic polynomials," by A. B. Frizell; "Mr. Paaswell's appeal to producing mathematicians," by C. N. Haskins; Review of Volterra's Leçons sur les Fonctions des Lignes, by G. A. Bliss; "Shorter Notices"; Lehmer's List of Prime Numbers from 1 to 10,006,721, by L. E. Dickson; Whitford's The Pell Equation, by T. M. Putnam; Liebmann and Engel's Die Berührungstransformationen: Geschichte und Invariantentheorie, by T. H. Gronwall; Pasch's Veränderliche